



NATIONAL PARK SERVICE

Environmental Audit Program

EnviroCheck Sheet

Antifreeze Management
June 2002 Update

ANTIFREEZE MANAGEMENT

The National Park Service (NPS) generates used antifreeze. The most common type, made from ethylene glycol, is used for freeze protection and as a heat transfer medium for motor vehicles, heavy equipment, and buildings. The NPS uses antifreeze in vehicles and in building plumbing systems.

During use, antifreeze is circulated throughout a coolant system and comes into contact with various metal parts. Recent studies conducted by the American Society for Testing and Materials (ASTM) determined roughly 40 percent of used antifreeze samples would be classified as a hazardous waste due to elevated levels of lead. Evidence suggests that lead contamination comes from contact with soldering seals, such as those found in automobile radiators. If used antifreeze is mixed with other wastes, such as used oil, the entire mixture may need to be disposed of as a hazardous waste. Keeping wastes segregated will increase disposal options and reduce disposal costs. Therefore, one rule should be kept in mind above all others: **do not mix used antifreeze with any other wastes.**

Antifreeze is toxic in even small amounts. Swallowing about three ounces of undiluted ethylene glycol may be lethal to humans, with kidney failure and death possible within 72 hours. Dogs and cats are especially attracted to antifreeze because it tastes sweet. Because antifreeze can be so dangerous, it must be carefully managed. Improper disposal can lead to serious health and environmental problems. Disposal of used antifreeze into a river or stream, via a storm sewer, road ditch, or direct discharge, can cause serious water quality problems. If poured on the ground or into park septic systems, groundwater contamination may result.

Recycling, either on-site or off-site, is the preferred method of managing used antifreeze within the NPS.

Auditor's Guidelines:

Records to Review

- State hazardous waste regulations
- Hazardous waste determinations
- Non-hazardous waste disposal records
- Recycling records

Features to Observe

- Auto shop procedures
- Waste storage areas

Persons to Contact

- Auto mechanic
- Building and utilities staff

LEGAL REQUIREMENTS

Federal

The Environmental Protection Agency (EPA) hazardous waste regulations set limits for certain metals and organic compounds in wastes. When these limits are exceeded, the waste is considered hazardous and must be appropriately managed and disposed. Anyone who drains used antifreeze from radiators is required to determine if the antifreeze is hazardous (examples of problem materials include lead and benzene). To limit its potential liability, each park unit must consider used antifreeze a potentially hazardous waste. That means the park must either test the antifreeze or obtain documentation from the state prior to managing it as anything other than a hazardous waste. (For a comprehensive explanation of the regulations applicable to hazardous wastes, see the Hazardous Waste Management EnviroCheck Sheet.)

State

States may specifically regulate waste antifreeze. For example, Washington's Department of Ecology issued guidance to make it easier to recycle antifreeze (call 1-800-633-7585 to receive a copy). In contrast, waste ethylene glycol is a listed, state-regulated hazardous waste under the Vermont Hazardous Waste Management Regulations (contact 802-241-3888). State and local authorities must be consulted to determine regulations affecting antifreeze, as they could be more stringent than federal requirements.

COMPLIANCE REQUIREMENTS

Disposal

Before used antifreeze can be stored or disposed of properly, a determination must be made as to whether it is a hazardous or non-hazardous waste. It can either be assumed to be a hazardous waste and disposed of as such, or it can be analyzed to prove it is non-hazardous. If used antifreeze is disposed of as non-hazardous, a generator must be able to provide proof that it is, in fact, non-hazardous. Ideally, a representative sample of used antifreeze should be tested using the Toxicity Characteristics Leaching Procedure (TCLP). The TCLP will indicate whether the sample contains any of 39 contaminants (including lead and benzene) above regulated thresholds. TCLP results should be maintained as long as waste antifreeze is generated. A new TCLP determination should be made if the antifreeze waste stream changes.

Hazardous Waste Antifreeze

To recycle antifreeze, a generator can either purchase an antifreeze filtration and/or distillation unit for on-site recycling, hire a vendor to perform on-site recycling of the waste antifreeze using leased equipment, or hire a licensed hazardous waste disposal firm to transport the waste to a licensed antifreeze recycling, treatment, and disposal facility. If a generator recycles its waste antifreeze on-site, they can recover antifreeze for future use, reduce the amount of hazardous waste generated at the facility, reduce hazardous waste transportation and disposal costs, and reduce long term liability associated with off-site hazardous waste management. An up-front capital investment of \$2,000 to \$6,000 for a recycling unit can have a short payback period when drastically reduced disposal costs and purchases of virgin antifreeze are figured into the equation. Spent solids from the recycling process are likely to contain greater than 5 mg/L of lead and should be handled as hazardous waste unless TCLP results indicate otherwise.

Antifreeze that is determined to be hazardous waste should only be picked up for transport by a licensed hazardous waste transporter, manifested, and delivered to a facility licensed to recycle antifreeze. In order for antifreeze to be recycled, it cannot be mixed with any other substances (e.g., waste oil, spent solvent, mop water, gasoline, or diesel fuel). If waste antifreeze is not being handled or disposed of according to applicable regulations, liability rests with the generator of the waste antifreeze.

Non-Hazardous Waste Antifreeze

If used antifreeze does not fail the TCLP for any contaminant, it is not considered a hazardous waste. Proper disposal procedures must still be followed. For instance, it cannot be dumped on the ground, and in most cases, it cannot be poured down the drain or disposed of at the local solid waste landfill. Used antifreeze can be recycled on-site or through a firm that recycles used antifreeze either at your facility or off-site. If the used antifreeze is not hazardous, it does not need a manifest for shipping to the recycler, nor does the used antifreeze count toward a generator's monthly hazardous waste generation totals.

POLLUTION PREVENTION

Recycling

Recycling helps keep antifreeze from being improperly dumped into waterways or onto land. Recycling antifreeze also saves money because: (1) Less new product will need to be purchased; (2) Disposal costs are avoided; and (3) Cleanup and liability costs for improper disposal are avoided.

On-site Recycling Technology

Appropriate on-site antifreeze recycling technology is available from GSA and the open market. Complete installation ranges in price from about \$2,000 to \$6,000 for most park units. Some suppliers are:

- BG Products, Inc. Wichita, KS 67213, 1-800-961-6228.
- Global EnviroScience Technologies, Inc. Long Beach, CA 1-800-600-8482.

Recycling technology includes fractional and vacuum distillation, ion exchange, filtration/centrifugation, ultra-filtration, and chemical filtration (flocculation, coagulation). Filtration is the most useful technology for park units.

Lengthen Antifreeze Use Time

Before choosing the recycling option, consider lengthening antifreeze service time in use to delay creating a waste product. Lengthening the amount of time antifreeze stays in service will reduce the volume of used antifreeze. (Keep in mind, however, that the longer antifreeze stays in service, the more likely it will pick up contaminants causing it to become hazardous waste.) It is easy to test antifreeze for its useful characteristics (i.e., corrosion inhibition and freeze protection) without draining it. Once the determination is made that the antifreeze must be replaced, it should be:

- Recycled on-site if it is **not** a hazardous waste (first preference); or
- Recycled off-site if it **is** a hazardous waste (second preference).

Keep in mind that in the past, automobile manufacturers did not recommend use of filtered, recycled antifreeze, and warned that warranties may be voided if they were used. Conversely, some heavy equipment manufacturers do not have reservations about used antifreeze recycled by fractional distillation. Check with equipment manufacturers before using recycled antifreeze.

Choose Less Toxic Alternatives

Propylene glycol is a less toxic alternative to ethylene glycol-based antifreeze. However, used propylene glycol would still need to be evaluated for EPA hazardous waste characteristics after use.

Do Not Mix Antifreeze with Other Substances

Never mix used antifreeze with any other substance, especially other potentially hazardous waste streams (i.e., used oil or solvent) as this could prevent used antifreeze from being recycled.

Success Stories

Jim Hester, Grand Teton NP, 1-307-739-3363. Lifetime antifreeze program.

FOR MORE INFORMATION

- NPS/Hazardous Waste Team. 1-202-565-1240 (x3)
- National Automotive Repair Compliance Assistance Center at 1-888-476-5465 or <http://www.ccar-greenlink.org/>.
- Safe Brands' propylene glycol antifreeze "Sierra." <<http://www.safebrands.com/>>.



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*The following checklist is not intended to be a comprehensive list of questions regarding the proper management of a park's antifreeze if it is a hazardous waste. Instead, it is intended to focus attention on an often-generated park waste stream that is easily overlooked as a **potentially** hazardous waste that must be managed as such. For a comprehensive list of questions regarding hazardous waste management, see the "Hazardous Waste Management EnviroCheck Sheet."*

CHECKLIST ITEM	PRIORITY	NOTES
State Regulations		
1. A determination has been made regarding whether the state has specifically listed used antifreeze as a hazardous waste or regulates it as a hazardous waste in any other way. [BMP]	3	
Determination		
2. Park staff has tested all antifreeze-related waste streams to determine whether they are hazardous, including: <ul style="list-style-type: none"> • Used antifreeze; or • Waste sludge from antifreeze if recycled on-site (if applicable). [40 CFR 262.11]	2	
Storage/Container Management		
4. If it has been determined that used antifreeze is hazardous, the container of used antifreeze is labeled with the words "Hazardous Waste – Antifreeze" and the accumulation start date [40 CFR 262.31. See the Hazardous Waste Management EnviroCheck Sheet for additional details on hazardous waste management requirements]	2	
5. If it has been determined that used antifreeze is hazardous, the container used to transport the antifreeze is compliant with DOT regulations. [49 CFR 172]	2	
Pollution Prevention/Green Procurement		
6. Opportunities to use propylene glycol antifreeze, instead of ethylene glycol, have been explored. [BMP]	3	
7. All antifreeze used at the park is recycled. [BMP, see Green Procurement EnviroCheck Sheet]	3	
8. Antifreeze purchased for use at the park meets the requirements specified under the Comprehensive Procurement Guideline (CPG) program. [EO 13148, see Green Procurement EnviroCheck Sheet]	2	